

But they do get pretty big...



There Is No Largest Prime Number



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Numbers

There Is No Largest Prime Number

The proof uses *reductio ad absurdum*.

Theorem

There is no largest prime number.

Proof.

- ① Suppose p were the largest prime number.

- ④ But $q + 1$ is greater than 1, thus divisible by some primenumber not in the first p numbers.



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- ② Let q be the product of the first p numbers.
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Theorem

There is no largest prime number.

Proof.

- ① Suppose p were the largest prime number.
- ② Let q be the product of the first p numbers.
- ③ Then $q + 1$ is not divisible by any of them.
- ④ But $q + 1$ is greater than 1, thus divisible by some prime number not in the first p numbers.



1 The Proof

Implications Of Our Theorem

Counting Primes

No matter which prime you have, you can find a bigger one.

How We Count Primes

3 is prime, but so is 7 and 7 is bigger than 3.

Warning!

Thinking you have the biggest prime can lead to poor results:

- Embarrassment
- Wrong results
- Broken encryption

Next steps

- Look for some big prime numbers.
- Then look for a bigger one.